

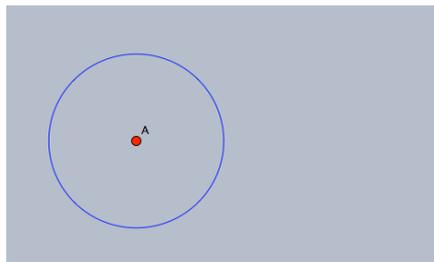
Handout 5

Automatic Proving Facilities of Cinderella

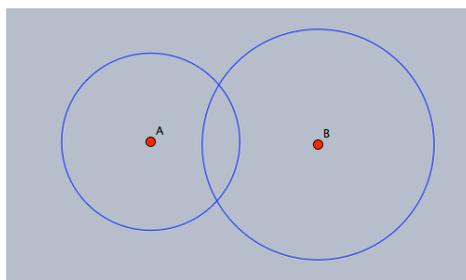
Cinderella has built-in automatic proving facilities that could be used to immediately check the correctness of your geometric conjectures. In this activity, you will see how to use these facilities to check the collinearity of the three points.

Student Activity:

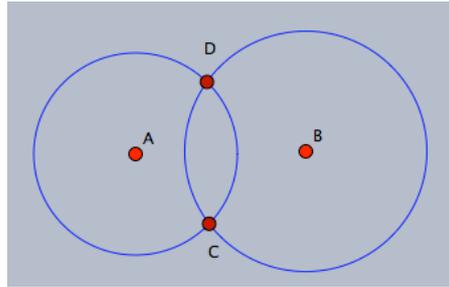
1. Launch Cinderella or open new Cinderella window.
2. Switch to **“Circle by Radius”** mode using **“Modes”** menu or by pressing the button  in the toolbar.
3. Move the mouse pointer over the construction area. Use a press-drag-release sequence with the mouse to add a circle with centre A.



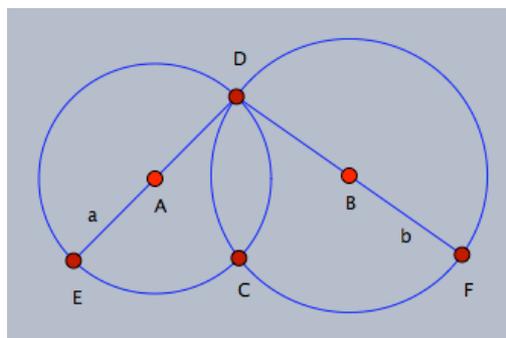
4. Add a second circle using the same mode such that the two circles intersect.



5. Generate the intersection points between the two circles, for doing so, switch to **“Intersection”** mode by pressing the button  in the toolbar, then select the two circles one at a time to generate their intersection points C and D. Your construction should look like the following figure before you continue.



6. Switch to **“line by two points”** mode by choosing the menu item **“Modes/line/by two points”**, by pressing the keyboard shortcut **“Ctrl+L”**, or by pressing the button  in the toolbar. Use a press-drag-release sequence with the mouse to add a line connecting the two points A and D.
7. Add another line connecting the two points D and B.
8. Switch to **“Intersection”** mode by pressing the button  in the toolbar. Select Circle A and Line a to get the intersection point E.
9. Using the same mode, select Circle B and Line b to get the intersection point F.
10. Open **“Cinderella’s inspector”** by choosing the menu item **“Edit/Information”**.
11. Select all lines by pressing the button .
12. Clip the two lines by choosing the clipping button  on the inspector. After clipping the two lines to their endpoints your construction should look like the following figure.



13. Use Cinderella’s dragging facility to drag free elements in your construction and visually observe the behavior of the three points F, C, and E? What can you say about the three points F, C, and E in terms of collinearity? i.e. Are they collinear? Anyway make a conjecture about the collinearity of the three points and Cinderella will check it for you.

14. To check the correctness of the made conjecture about the collinearity of the three points, open Cinderella's information window by choosing the menu item "**View/Information Window**" or pressing the keyboard shortcut "**Ctrl+5**". A console window pops up in which an automatic report about the configuration will appear. Now, switch to the "**Line, by two points**" mode by pressing the button  to construct the line that connects the two points F and E, and then move the mouse pointer toward the point F press the left mouse button, hold it then drag the mouse over point E then release the mouse button. Notice the message that is given in the Cinderella Console Window, which indicates that point C lies on the connecting line of F and E.
15. Produce as many mathematical proofs as possible to prove the investigated conjecture.
16. Use different facilities of Cinderella to make up as many new conjectures as possible by elaborating – extending, modifying, or adapting – the conditions of the given situation.